

MILIUSA WAYANADICA (ANNONACEAE),
A NEW SPECIES FROM WESTERN GHATS, INDIA

M.K. Ratheesh Narayanan, P. Sujanapal, and N. Anil Kumar

MS Swaminathan Research Foundation
Wayanad – 673121, Kerala, INDIA

N. Sasidharan

Kerala Forest Research Institute
Peechi, Thrissur-680653, Kerala, INDIA

M. Sivadasan

King Saud University
Riyadh 11451
KINGDOM OF SAUDI ARABIA

ABSTRACT

A new species of *Miliusa* Lesch. ex A. DC. (Annonaceae) allied to *M. indica*, sect. *Miliusa*, is described and illustrated from the Western Ghats of India.

RESUMEN

Se describe y se ilustra una nueva especie de *Miliusa* Lesch. ex A. DC. (Annonaceae) emparentada con *M. indica*, sect. *Miliusa*, de Western Ghats en la India.

INTRODUCTION

The genus *Miliusa* Lesch. ex A. DC. is currently recognized with 40 species mostly of Austral-Asiatic ranges from India, Sri Lanka, and Bhutan to Australia through the Malayan islands (Mols & Keßler 2003). Ten species are reported from the Austro-Malesian area (Mols & Keßler 2003), 33 species from continental Asia (Tanawat, pers. comm.), and three species from Sri Lanka (Huber 1985). In India the genus is represented by 15 species distributed mainly in western and northeastern regions and Andaman and Nicobar Islands (Mittra 1993). Western Ghats is an important center of *Miliusa* in Peninsular India. Six species of *Miliusa* are reported from Kerala (Sasidharan 2007). Ramamurthy (1983) reported five species from Tamil Nadu. Recently, a new species was described from the Kalakkad-Mundanthurai Tiger Reserve of Tamil Nadu (Murugan et al. 2004). Five species of *Miliusa* are known from Karnataka (Saldanha 1984; Sharma et al. 1984). Among the 15 species in India, four species are endemic to Western Ghats (Mittra 1993; Murugan et al. 2004). This includes the red listed *Miliusa nilagirica* Bedd. (IUCN 2006).

Wayanad district in Kerala is unique. The entire area is along the Western Ghats with altitudes ranging from 700 m to 2100 m msl. During our floristic exploration in the forests of Wayanad, some specimens of *Miliusa* collected from the hilltops of Meppady and Kalpetta Forest Ranges were strikingly different from other species of *Miliusa*, due to their recurved petals. On critical study with the available literature and comparison with authentic specimens, it is confirmed that the material does not match with any previously described species. Therefore it is described and illustrated here as a new species.

Finet and Gagnepain (1906) recognized two sections in the genus viz, sect. *Saccopetalum* (Benn) Finet & Gagnep. and sect. *Miliusa*. Mols and Keßler (2003) did not refer to these sections in their revisionary studies of *Miliusa* in the Austro-Malesian area. However, Huber (1985) followed this categorization in his treatment for *A revised Handbook to the Flora of Ceylon*. These sections were solely based on the number of ovules. Section *Saccopetalum* is characterized by a minimum number of four ovules and sect. *Miliusa* is characterized by a maximum of two ovules. Earlier these two sections were recognized as separate genera. Following Finet and Gagnepain (1906), our species belongs to the sect. *Miliusa* due to the 1–2-ovuled carpels and is resembles to *Miliusa indica* with intermediate characters of *M. nilagirica*. Van Heusden (1992) studied morphology,

classification, and evolution of flowers in Annonaceae and described the flower morphology in the *Miliusa* group. He did not mention anything about the recurved nature of inner petals in *Miliusoid* flowers. This peculiarity is not only a unique character of *Miliusa wayanadica* but also a novelty in the genus itself.

Miliusa wayanadica Sujanapal, Ratheesh & Sasidharan, sp. nov. (**Figs. 1–2**). TYPE: INDIA. KERALA. Wayanad district: Kurichiarmala, N 11° 35.769'E 75° 58.787' ±1092 m, 20 Feb 2002, N Sasidharan & M.K. Ratheesh Narayanan MSSH 2642 (HOLOTYPE: MH; ISOTYPES: CAL, CALI, KFRI, Herb. MSSRF, Kalpetta, Wayanad).

Miliusae indicae sectionis Miliusae similis foliis subsessilibus elliptico-lanceolatis ad lanceolatis, infra: nervis pubescentibus, flore axillari solitario, carpello ampulliformi ovulis 1 vel 2, sed folii basi obliqua, sepalis late ovatis, petalis interioribus recurvatis adaxialiter pilosis, staminibus minus numero, carpellis glabris differt.

Miliusa wayanadica (sect. *Miliusa*) is similar to *M. indica* in its axillary, solitary flowers, 1–2-ovuled, flask-shaped carpels, and subsessile, hairy-nerved, elliptic-lanceolate or lanceolate leaves. But it differs in its oblique leaf bases, broadly ovate sepals, recurved inner petals with hairs on the abaxial side, fewer stamens, and glabrous carpels.

Shrubs to small trees, to 7 m height; bark black, branches terete, branching horizontal, young parts densely pubescent. Leaves simple, alternate, 6–9 × 2–3 cm, lanceolate or elliptic-lanceolate, base rounded, slightly oblique, apex caudate acuminate, petiole to 3 mm or subsessile, coriaceous, lateral nerves 5–8 pairs, intramarginal nerves sub-marginal, tomentose on both sides, margins entire. Flowers yellow or yellowish-green, solitary, axillary or slightly above the axil, pedicel 4–7 mm long, glabrous, bracteoles two at the base, unequal, triangular, very small; sepals 3, ca. 4 × 3 mm, broadly ovate; outer petals 3, triangular, ca. 3 mm long, slightly curved on mature flower, prominently hairy on margins; inner petals 3, broadly ovate, 7–9 × 2–4 mm, upper half out-curved at 90°, hairy on the mouth; torus triangular, long hairy, stamens 6+3, anthers in pairs, staminodes 3, arranged alternate with two stamens, one pair slightly above the staminode, connective slightly prolonged above the anther, connective truncate, anthers extrorse; carpels 7–12, flask shaped, 2 mm long, glabrous, stigma club-shaped, with viscous exudation on the torus in mature flower, ovules 1 or 2. Monocarps 6–8, subglobose, glabrous, brownish or blackish when dry, apiculate; stipe terete, 10–13 mm long, stalk of monocarps ca. 5 mm, monocarp 8–10 mm across; seeds 1 or 2.

PARATYPES: INDIA. KERALA. Wayanad district: Kurichiarmala, N 11°35.769'E 75°58.787' ±1100 m, 20 Feb 2002, M.K. Ratheesh Narayanan MSSH2642; 18 Jul 2007, *Ibid.*, M.K. Ratheesh Narayanan MSSH4050; Kalladi-900 forest N 11°30.716'E 76°06.239' ±899 m, 12 Feb 2004, M.K. Ratheesh Narayanan MSSH4371; *Ibid.*, Jun 2007, M.K. Ratheesh Narayanan & P Sujanapal MSSH3600; *Ibid.*, Aug 2007, M.K. Ratheesh Narayanan MSSH3367; Kattimattam, N 11°30.127'E 76°08.110' ±1049 m, 12 Mar 2006, M.K. Ratheesh Narayanan & P Sujanapal MSSH2896. (All in Herb. MSSRF, Kalpetta, Wayanad)

Flowering and fruiting.—Flowering starts from December and peak time is March. More flowers were observed on the exposed lower branches. Occasional flowering was observed outside this season, especially in the non-rainy season.

Etymology.—The specific epithet denotes the locality, a unique area with diverse topographical peculiarities and a Hot Spot of Biodiversity in the Western Ghats.

Distribution and status.—Small populations of this species were observed in two locations in Wayanad. At Kurichiarmala of Kalpetta Forest Range few individuals were observed. Kalladi forest areas in Meppadi Forest Range the population is comparatively large with small tree-sized individuals.

Habitat and conservation.—Evergreen forests between 800 m to 1400 m asl is the most common habitat of the new species. It is mostly seen along the sides of streams as a lower stratum tree or shrub. *Miliusa nilagirica* is also found in the same habitat. Other Annonaceae species in the habitat are *Desmos lawii* (Hook. f. & Thoms.) Safford, *Meiogyne ramarowii* (Dunn) Gandhi, and *Orophea sivarajanii* N. Sasidharan. The other tree associates in the habitats are *Agrostistachys borneensis* Becc., *Dimocarpus longan* Lour., *Drypetes venusta* (Wight) Pax & K. Hoffm., *Epiprinus mallotiformis* (Müll.-Arg.) Croizat, *Holigarna ferruginea* Marchand, *Euonymus indicus* Heyne ex Roxb., *Hydnocarpus alpina* Wight, *Myristica beddomei* King, *Palaquium ellipticum* (Dalz.) Baill., *Paracroton pendulus* (Hassk.) Miq. ssp. *zeylanicus* (Thwaites) N.P. Balakr. & Chakrab., etc. In all the locations, population size of this new species is small. None of the localities of distribution is under any protected areas.

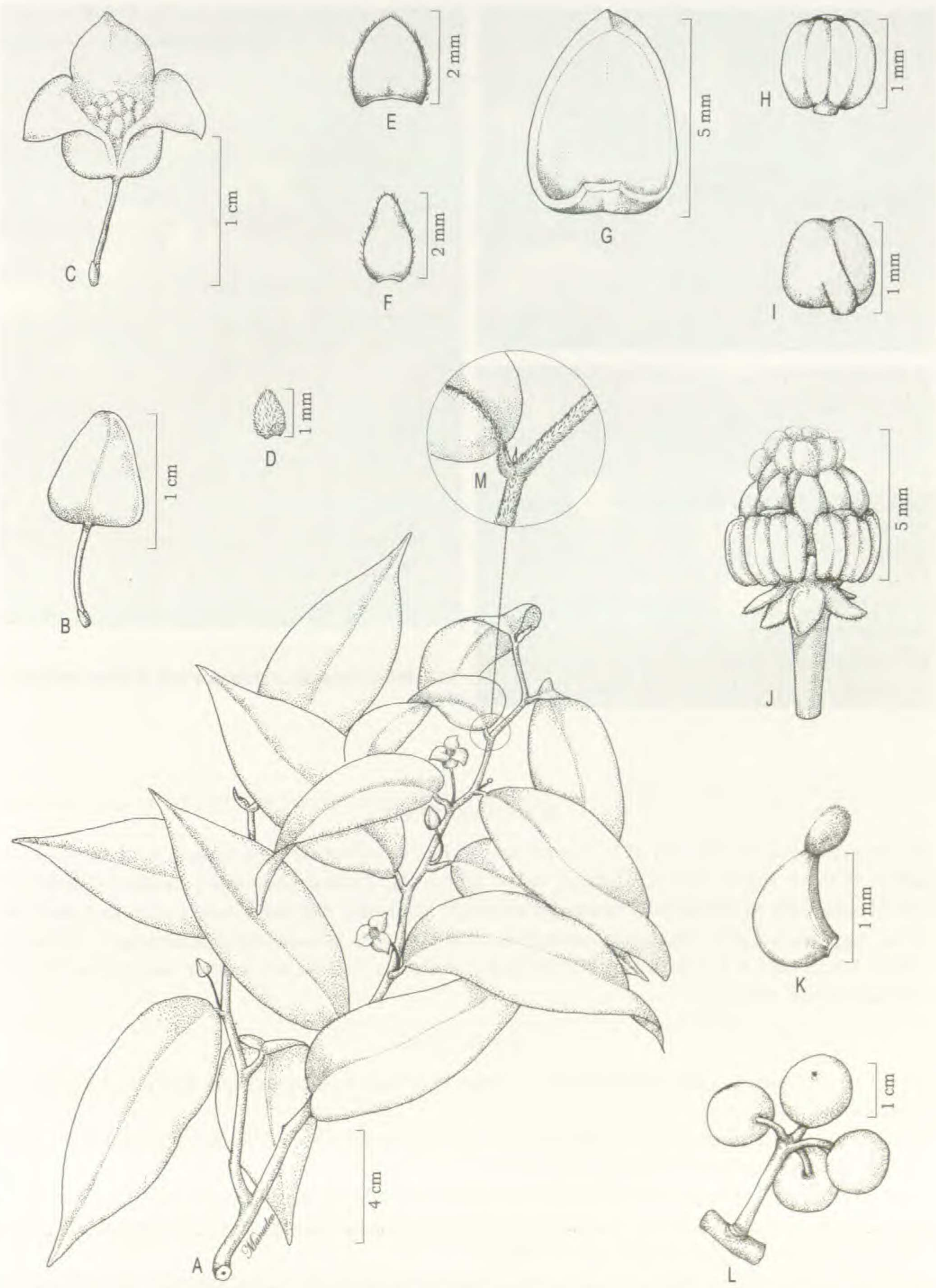


FIG. 1. *Miliusa wayanadica*. A. Flowering twig; B. Flower bud; C. Flower; D. Bracteole; E. Sepal; F. Outer petal; G. Inner petal; H. Stamen-Ventral view; I. Stamen-Dorsal view; J. Flower with petal removed; K. Pistil; L. Fruit; M. Leaf node enlarged.



FIG. 2. *Miliusa wayanadica*. A. Flowering twig. B. Flower enlarged. C. Fruiting.

ACKNOWLEDGMENTS

We are grateful to the Director of M.S Swaminathan Research Foundation. Our sincere thanks to P.J.A. Keßler, Director, Hortus Botanicus Leiden, Leiden University; Tanawat Chaowasku, Leiden University for critical comments on the identity of new species and JF Veldkamp, Rijksherbarium, Leiden for translation of the diagnosis to Latin. Illustrations were done by K. Manudev. Various help extended by C.S. Dhanya, Smitha S Nair, and K.A. Sujana is acknowledged with thanks. Guy Nesom and an anonymous reviewer provided helpful reviews.

REFERENCES

- FINET, A AND F. GAGNEPAIN. 1906. Contribution a l etude de la flore d l' Asie orientale. Mem. Soc. Bot. France 4:55–170.
- HUBER, H. 1985. Annonaceae In: M.D. Dassanayake and F.R. Fosberg, eds. A revised handbook to the flora of Ceylon Vol.5. Amerind Publishing Co. New Delhi. Pp. 1–75.
- IUCN, 2006. 2006 IUCN red list of threatened species. <http://www.iucnredlist.org> accessed on [12-10-2009]
- MITRA, D. 1993. Annonaceae In: B.D. Sharma, N.P. Balakrishnan, R.R. Rao, and P.K. Hajra, eds. Flora of India Vol. 1. Botanical Survey of India. Calcutta. Pp. 202–307.
- MOLS, J.B AND P.J.A. Keßler. 2003. The genus *Miliusa* (Annonaceae) in the Austro-Malesian area. Blumea 48: 421–462.
- MURUGAN, C, V.S. MANICKAM, V. SUNDARESAN, AND G.J. JOTHI. 2004. *Miliusa tirunelvelica*, a new species of Annonaceae from the Kalakkad–Mundanthurai Tiger Reserve, Western Ghats, India. Novon 14:102–104.

- RAMAMURTHY, K. 1983. Annonaceae In: N.C. Nair and A.N. Henry, eds. Flora of Tamil Nadu, India Vol. 1. Botanical Survey of India. Southern circle, Coimbatore. Pp. 3–7.
- SALDANHA, C.J. 1984. Flora of Karnataka Vol.1: Mangoliaceae to Fabaceae. Oxford & IBH Publishing Company, New Delhi.
- SASIDHARAN, N. 2007. Flowering plants of Kerala (CD). Kerala Forest Research Institute, Peechi, Thrissur.
- SHARMA, B.D, N.P. SINGH, R.S. RAGHAVAN, AND U.R. DESHPANDE. 1984. Flora of Karnataka. Analysis, Botanical Survey of India, Calcutta.
- VAN HEUSDEN, E.C.H. 1992. Flowers of Annonaceae: morphology, classification and evolution. Blumea (Suppl.) 7.